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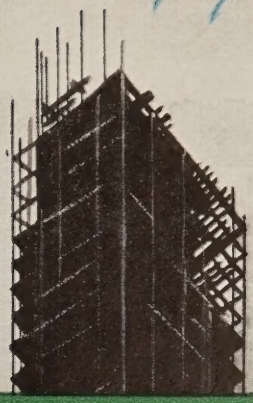
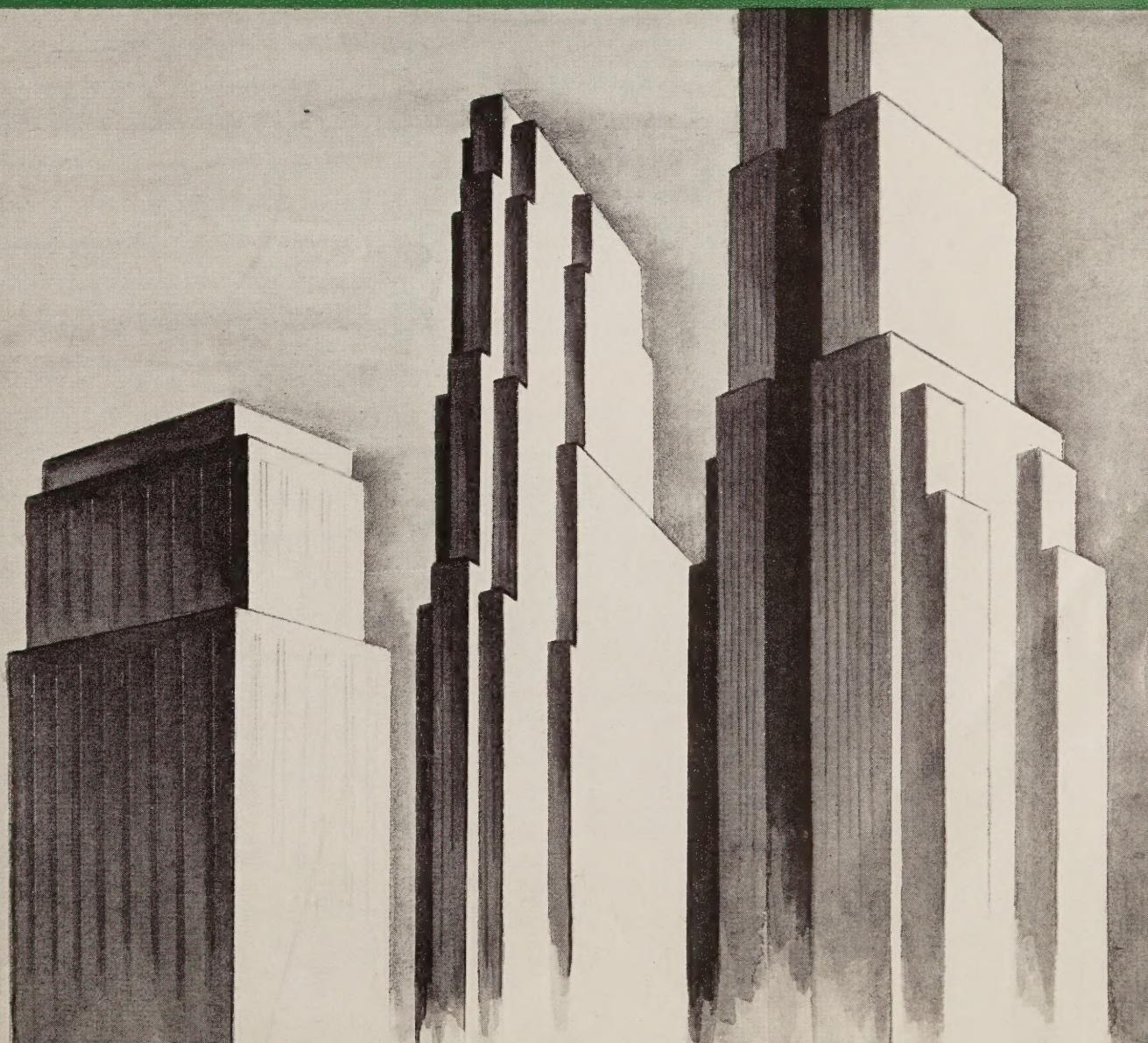


PLANNING

FOR TELEPHONES IN LARGE BUILDINGS



BELL TELEPHONE SYSTEM Services

THE BELL TELEPHONE SYSTEM offers a wide variety of facilities and services to meet many kinds of communications needs. Every type of facility, whether large or small, is designed to provide the maximum in efficient and convenient service.

In addition to the familiar main and extension telephones, there are numerous types and sizes of private branch exchanges, manual and dial; various other inter-communicating arrangements and executive systems; order taking equipments; loudspeaker, code calling and other signalling devices; teletypewriter and mobile telephone services, and special services to meet special needs.

Bell Telephone service is so arranged that the same equipment on the customer's premises may be used for communication from room to room, building to building, city to city and overseas. The Telephone Company installs and maintains all the equipments which it furnishes. Customers ordinarily make no capital investments in connection with such services. Changes and rearrangements are made at nominal charges, if any.

To take full advantage of this wide variety of services, the cable and wiring facilities provided in a building should be flexible and adequate for future as well as present needs. In the larger buildings the owner should provide for the entrance of one or more telephone cables; terminating frames or cabinets for these cables; space in the form of conduits or shaftways for cables to the various floors; and an underfloor duct, conduit or similar systems for distributing telephone wires or cables to telephone equipment locations.

The Associated Companies of the Bell Telephone System maintain an "Architects and Builders Service," with competent telephone engineers to assist in planning the telephone cabling and wiring arrangements for all types of buildings. Their services are always available free of charge, simply by calling the nearest Bell Telephone Business Office.

PLANNING

FOR TELEPHONES IN LARGE BUILDINGS

Cable Entrances

Telephone entrance cables are usually run underground from a manhole in the street through the building foundation wall to a cross connecting terminal in the basement. The Telephone Company should be consulted in planning for such cables because:

(a) The availability of facilities in the underground telephone cable plant often controls the selection of the entrance point;

(b) In some localities basements are too damp or may be subject to flooding. If so the cable terminals must be located higher in the building;

(c) If the telephone cable plant is aerial instead of underground and this might control the cable entrance point.

If the cable entrance is through the foundation walls as is usually the situation, a sufficient number of 3½-inch iron pipes or sleeves, or 4-inch clay sewer tiles to care for future cables which might be needed, as well as cables to be placed immediately, should be placed in the foundation walls during construction. These holes are kept sealed to avoid the entrance of water.

Main Building Cable Terminals

The Telephone Company terminates the individual circuits in the entrance cables on a cross-connecting terminal of either the floor or wall frame type, shown in Figures 1 and 2 respectively. The wall type is used in buildings having up to about 40,000 sq. ft. of rentable floor area. In larger buildings the floor frame type shown in Figure 1 is almost always used.

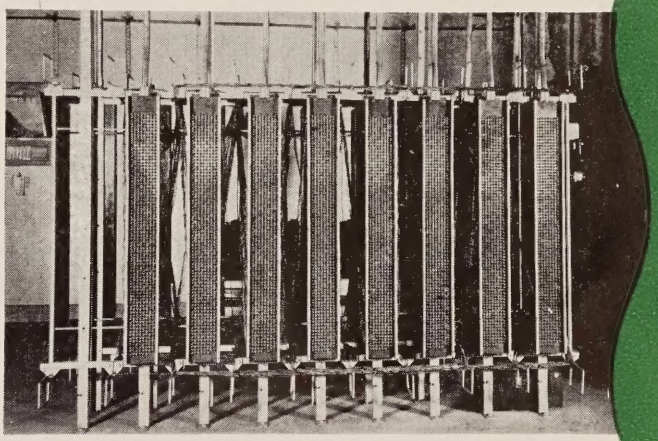


Fig. 1

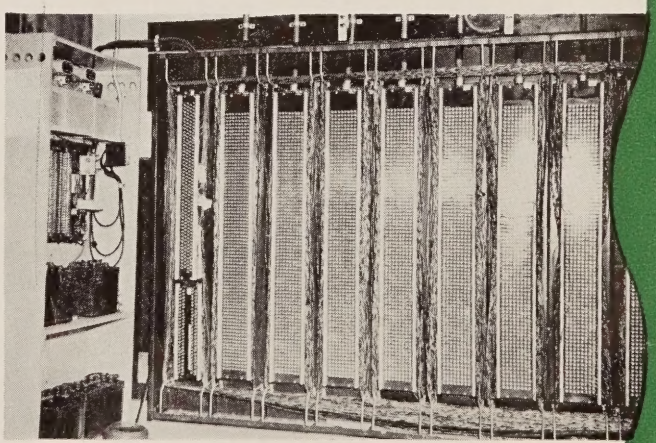


Fig. 2

Cable Terminal Rooms

A terminal room for housing the terminal frames, batteries, etc. is very desirable, particularly in the larger buildings, because these separate rooms avoid the possibility of damage to the facilities and interruption of service to a large number of telephones through careless handling of materials or merchandise, or a minor fire. Figure 3 shows a typical floor plan for a cable terminal room in a large building. The ceiling height should be about 9 ft. 6 in. Telephone Company engineers should be consulted regarding the length of the room, because the length of the frame depends upon the number of telephones required in the building.

While the cable terminal room is generally in the basement because the space is less valuable at that point, this room should obviously be located near the center of the cable distribution system in order to minimize the amount of cable used, conserve riser shaft space and conduit facilities etc., and improve the general appearance of the overall job. In certain buildings such as

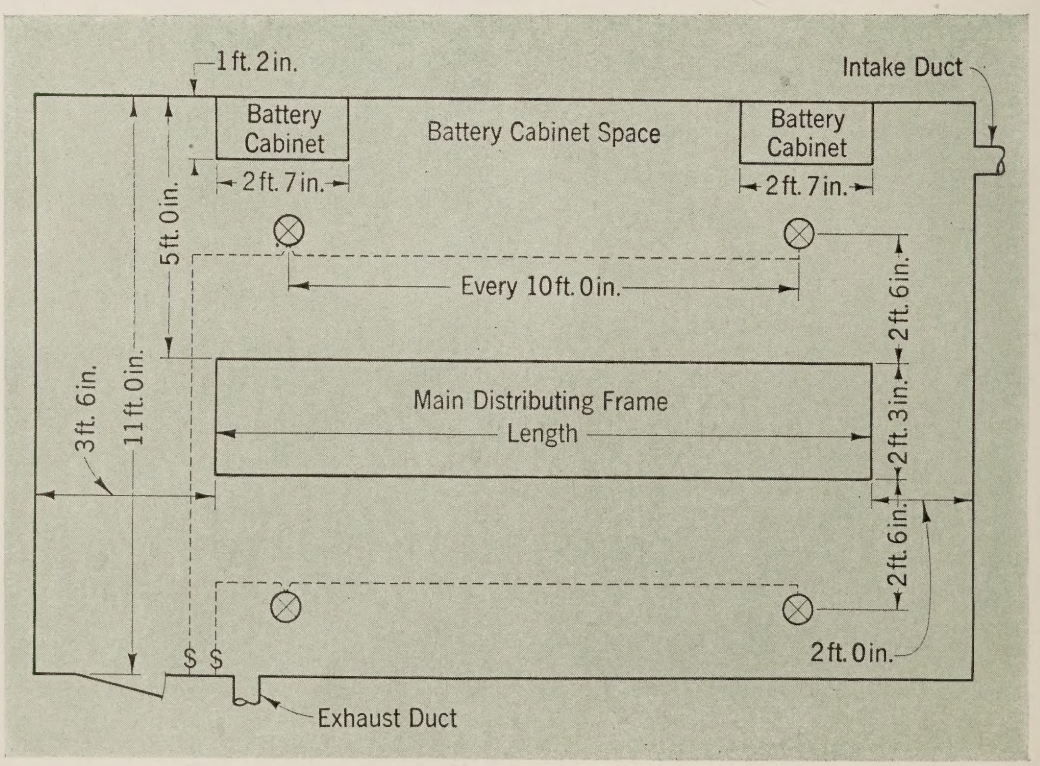


Fig. 3

hotels and department stores having large private branch exchanges, the wire center for the building is at the switchboard location and the cable terminal room should necessarily be near that point.

Telephone Cable Distribution System

Figure 4 shows a typical cable distribution system for a large building. It will be noted that the incoming service cables terminate on a cable terminal shown in the basement. From this point building cables lead up to the various floors through riser cable shafts where distribution cable terminals are located on each floor. At this point distribution cables run through underfloor conduits to telephone wall cabinets located at several points on each floor. These wall cabinets connect to an underfloor duct or conduit system for carrying telephone wires or cables to individual telephones or equipments at almost any point on the floor.

Figure 5 shows a typical underfloor duct system for one floor of a large building. In this case there are two riser shafts and four telephone wall cabinets on the floor. The single run-around duct system includes facilities for establishing telephone outlets in the floor at 2 foot intervals all around the exterior walls where desks and other office furniture requiring telephone service are most likely to be placed.

Figure 6 shows conduits employed as an underfloor distribution system. Conduits such as these are usually limited to relatively small buildings because they are not as flexible as the underfloor duct system.

Office, Loft and Public Buildings

The telephone arrangements for office buildings are complicated and subject to frequent changes because of the wide requirements of different tenants. It is possible, however to meet these changing requirements properly by means of a permanent cable system of the type described here

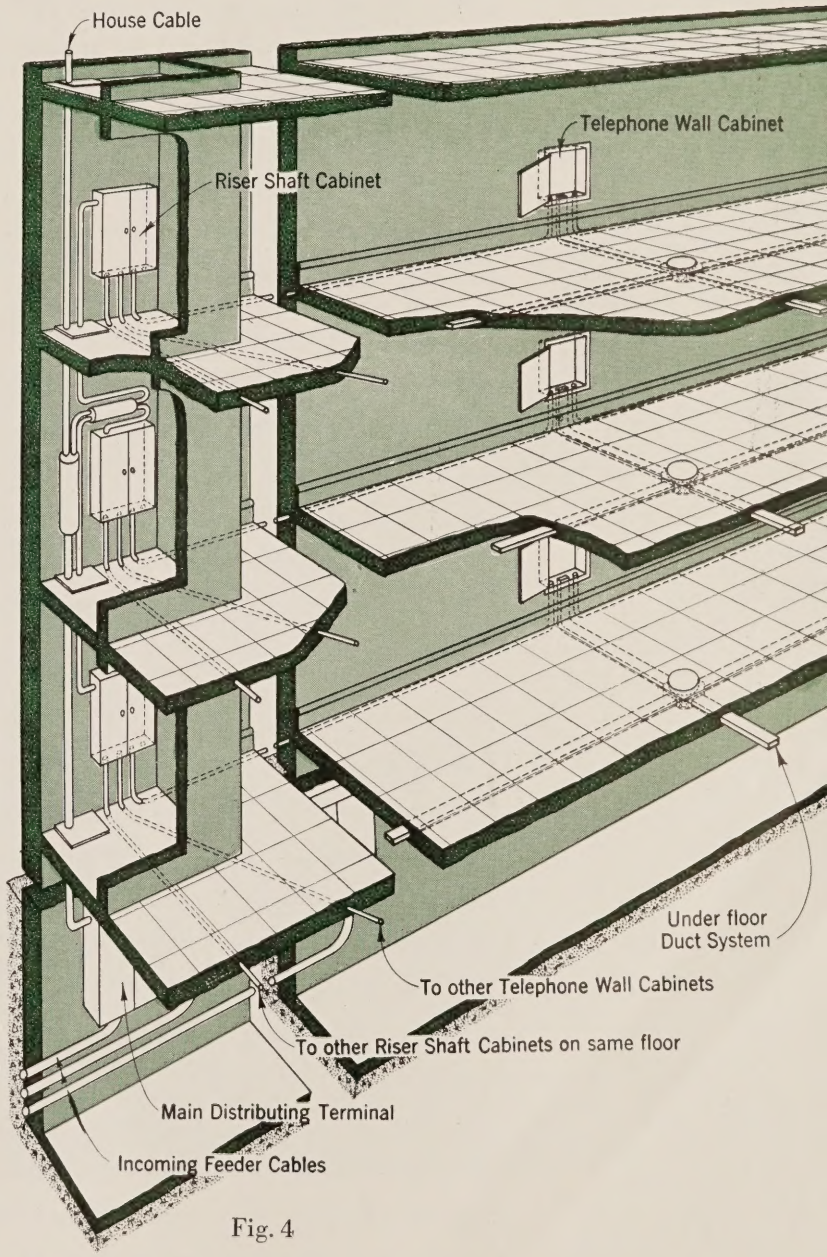


Fig. 4

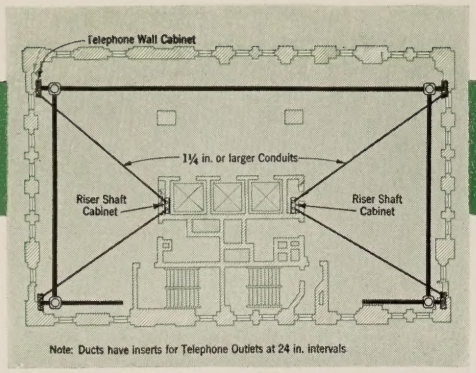

Telephone Wall Cabinet
1¼ in. or larger Conduits
Riser Shaft Cabinet
Riser Shaft Cabinet
Note: Ducts have inserts for Telephone Outlets at 24 in. intervals

Fig. 5

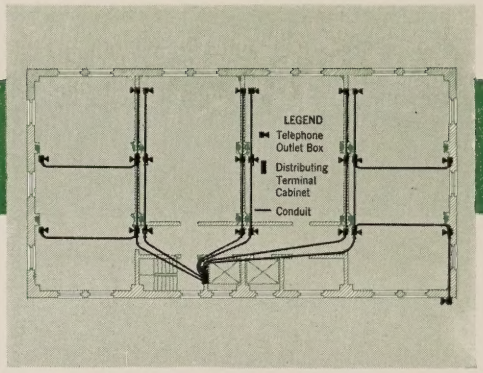


Fig. 6

if in the initial design of the building the matter of space requirements for telephone wires, cables and equipments are planned to take care of future occupants as well as the immediate requirements of the tenants occupying the buildings initially. The telephone engineers can be of valuable assistance in making these plans.

In loft buildings the floors are usually undivided and telephone locations are frequently not known until the space is occupied. Therefore, providing for wire distribution in advance requires some general system of ducts or raceways in the various floors. Usually the heaviest concentration of telephones will be in those sections of the building best adapted for office space.

In public buildings, such as Federal, state and municipal buildings, banks, railroad terminals, docks, auditoriums, convention and exhibition halls, the problems involved in the design of facilities for telephones are in general similar to those found in office buildings, except that special provisions are frequently required for either permanent or temporary services, such as press wires and radio and television pick-up circuits. Sometimes an extremely heavy concentration of telephones is also needed for meetings. In auditoriums, convention halls and similar buildings conduits or other raceway systems of adequate capacity should be provided to take care of the large groups which assemble in such places.

Hotels and Hospitals

The ultimate requirements for telephone service in hotels can be fairly accurately determined because the number of telephones required is closely tied in with the number of rooms. Since the locations of the telephones in the various rooms are generally permanent, the wire distribution system can be more accurately estimated than for office buildings and can usually consist of conduits or other small raceways. Cables from the central office are terminated near the switchboard and building cables are run through the riser shaft or conduits to floors above or below the switchboard.

Hospital installations are largely similar to hotels in that the locations of the telephone outlets are relatively fixed.

Apartment Houses

Generally in apartment houses wires from each apartment run from outlets through conduits to building cables which

in turn are connected to central office cables. The telephone outlets provided in the apartments should be sufficient in number and their location arranged so as to afford the greatest possible convenience in using the service for both making and answering calls. Therefore, conduits and related facilities should not only meet immediate needs but also possibly different requirements of succeeding tenants. (Fig. 7)

Special Signals

Where code calling signals, auxiliary lamps or chime signals are associated with telephone service, these signals may be mounted on the walls at about door frame height or higher. The signal locations should be connected to the telephone wiring distribution system by concealed conduits or other raceways. These signals generally operate on the commercial power supply and require a separate convenience outlet nearby.

Private Branch Exchanges

Private branch exchange switchboards are required in many buildings, and especially in large office buildings, factories, department stores, hospitals and hotels. For the operation of the larger installations of these private branch exchanges, power machines, storage batteries and terminal frames are required. Sufficient space should be provided for such equipment. Also, floor space should be set aside for the telephone operators' quarters. Facilities permitting adequate light and ventilation should be available in the space allocated for these purposes. Space should be provided for additional switchboard positions and related apparatus whenever it appears that the tenant's business may grow. Figure 8 shows a private branch exchange switchboard.

The Telephone Company should always be consulted during the planning of the

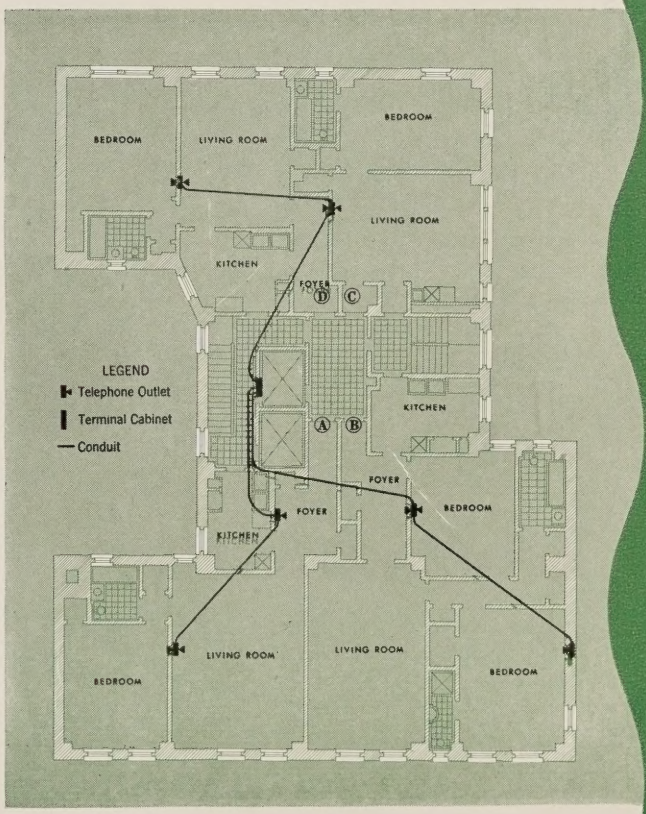


Fig. 7

Fig. 8

building to determine the floor space and arrangement needed for the switchboard equipment and operators' quarters.

Public Telephones

Office buildings, hotels, theaters, clubs, hospitals, stores, etc., generally require public telephone facilities for the convenience of occupants and patrons. These facilities include booths in which the telephones are placed and tables or shelves for the telephone directories (See Figure 9).

By including these facilities in the design of a building, it is possible to increase their usefulness and general appearance, because they can easily be located at a point most convenient to the public, and can be made to harmonize with their surroundings. It is recommended, therefore, that the builders install booths and perhaps directory space as a permanent part of a building. Alcoves or rooms having easy access often prove to be very satisfactory locations.

Telephone booths should be adequately lighted and ventilated. Doors should be so designed as to remain open when the booths are not in use. Sometimes ventilating systems are found necessary.

Helpful information on the planning of built-in telephone booths may be obtained from the Telephone Company by calling the nearest Business Office and asking for "Architects and Builders Service."

In large railroad terminals and at other strategic points where the need for public telephone service warrants it, attended public telephone service is sometimes provided.

Fig. 9